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LR Welch - ACM SIGPLAN OOPS Messenger, 1996 - portal.acm.org

... the statement-level control flow graph (CFG) by examining ... Figure 3: The **analysis**

process ... arbitrary inter-**object** concurrency relations from **annotated** call graphs ...

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MD Smith, G Holloway - Division of Engineering and Applied Sciences, Harvard ..., 2001 - eecs.harvard.edu

... In particular, the peep pass uses the **CFG** and **BVD** ...

The CFA library is used when dominator

**analysis** is needed ... string specified in the target lib **annotation** on the ...

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J von Ronne, A Hartmann, W Amme, M Franz -

Proceedings of the inaugural conference on the Principles ..., 2002 - portal.acm.org

... exists a path through the program's **CFG** which starts ... to convey the results of escape

**analysis** in order ... Nec97] and TAL [GMG99] are **annotation** techniques that ...

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EYS Hu, A Wellings, G Bernat - Second workshop on WCET analysis, 2002 - [www-users.cs.york.ac.uk](http://www-users.cs.york.ac.uk)

... The OGTRG can be produced from the **analysis** of the OTLG and **CFG** ... Based on the **CFG**, an OTLG for each **object** or those **objects** de- noted with **annotation** A3 in ...

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P Tarr, LA Clarke - Proceedings of the 1st ACM SIGSOFT symposium on Foundations ..., 1993 - [portal.acm.org](http://portal.acm.org)

... For example, a data flow **analysis** tool might be employed to detect anomalous sequences of events (38 ... **CFG** and def/ref annotations ... 3 **Object** Management Requirements ...

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AM Chepovsky, AV Klimov, AV Klimov, YA Klimov, AS ... - Perspectives of System Informatics//Andrei Ershov Fifth ..., 2003 - Springer

... Graph (**CFG**). – Binding Time **Analysis** (BTA): CIL instructions in **CFG** are

**annotated** as static, dynamic or special. To represent ...

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**Object**-based data flow testing of web applications - group of 3 »

CH Liu, DC Kung, P Hsia - Quality Software, 2000.

Proceedings. First Asia-Pacific ..., 2000 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... In the past two decades, data flow **analysis** techniques

have been used to guide the testing of traditional and **Object**-Oriented programs [S, 9, 10, 11, 12]. ...

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Automatic analysis of consistency between implementations and requirements: a case study - group of 2 »

M Chechik, J Cannon - Computer Assurance, 1995.  
COMPASS'95. Systems Integrity, ..., 1995 -  
ieeexplore.ieee.org

... 2.3 Improvements to **Analyzer** During this case study, we found out that we need a richer **annotation** language and better **analysis** techniques than were ...

Cited by 7 - Related Articles - Web Search

Escape analysis for Java - group of 15 »

JD Choi, M Gupta, M Serrano, VC Sreedhar, S ... - ...  
SIGPLAN conference on **Object**-oriented programming, systems, ..., 1999 - portal.acm.org

... M. The intuition easily extends to the escapement of an **object** from a thread. 3

Intraprocedural **Analysis** Given the control flow graph (CFG) representation of a ...

Cited by 293 - Related Articles - Web Search - BL Direct

OpenJIT Frontend System: an implementation of the reflective JIT compiler frontend - group of 9 »

H Ogawa, K Shimura, S Matsuoka, F Maruyama, Y ... -  
LNCS 1826: Reflection and Software Engineering, 2000 -  
Springer

... published so far analyzed the **CFG** directly, and ... The OpenJIT Class **Annotation Analyzer** module extracts the ... array assuming that the **annotation object** has been ...

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2000 IEEE International Symposium on V  
Languages (VL'00) p. 5

**High-Level Static and Dynamic Visualization of  
Software Architectures**

John Grundy, University of Auckland

John Hosking, University of Auckland

Full Article Text:



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### Abstract

Developing software architectures for complex so  
applications is challenging, and requires good stat  
dynamic visualisation support. We describe the vi  
software architecture modelling visual language w  
developed and its support in the SoftArch environ  
Static software architecture views are developed u  
this language, and designs and implementations

developed from these specifications. Static views are copied, animated and annotated to visualize running system architecture characteristics. This approach provides better static modelling and dynamic visualisation of software architectures, at varying levels of abstraction, than do other current techniques.

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**Additional Information**

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**Citation:** John Grundy, John Hosking, "High-Level Static and Dynamic Visualization of Software Architectures," *VL*, p. 5, 2000 IEEE International Symposium on Visual Languages (VL'00), 2000.

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1 [Visualization for program understanding: A system for graph-based visuali](#)  
[evolution of software](#)



Christian Collberg, Stephen Kobourov, Jasvir Nagra, Jacob Pitts, Kevin W  
 June 2003 **Proceedings of the 2003 ACM symposium on Software visua**  
**Publisher:** ACM Press

Full text available: ☒ pdf(3.80 MB) Additional Information: [full citation](#), [abst](#)  
[citions](#)

We describe GEVOL, a system that visualizes the evolution of software drawing technique for visualization of large graphs with a temporal com extracts information about a Java program stored within a CVS version c displays it using a temporal graph visualizer. This information can be us to understand the evolution of a legacy program: Why is the program str is? Which programmers were responsibl ...

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1 [Toward visual debugging: integrating algorithm animation capabilities with  
debugger](#)



Sougata Mukherjea, John T. Stasko

September 1994 **ACM Transactions on Computer-Human Interaction** (  
Issue 3

**Publisher:** ACM Press

Full text available: [pdf\(1.87  
MB\)](#)

Additional Information: [full citation](#), [at  
index terms](#)

Much of the recent research in software visualization has been polarized domains. In one domain that we call data structure and program visualization, views of program structures are generated automatically. These types of views require programmer input or intervention, can be useful for testing and debugging, however, their generic, low-level views are not expressive enough to compare programs ...

**Keywords:** algorithm animation, debugging, programming environment, user interfaces


2

[Fast detection of communication patterns in distributed executions](#)

Thomas Kunz, Michiel F. H. Seuren


November 1997 **Proceedings of the 1997 conference of the Centre for A Collaborative research**

**Publisher:** IBM Press

Full text available:  [pdf\(4.21 MB\)](#) Additional Information: [full citation](#), [at terms](#)


Understanding distributed applications is a tedious and difficult task. Vis process-time diagrams are often used to obtain a better understanding of application. The visualization tool we use is Poet, an event tracer develop Waterloo. However, these diagrams are often very complex and do not p desired overview of the application. In our experience, such tools display non-trivial commun ...

### 3 Debugging and finding faults: Interactive visual debugging with UML

 Timothy Jacobs, Benjamin Musial

June 2003 **Proceedings of the 2003 ACM symposium on Software visua**

**Publisher:** ACM Press

Full text available:  [pdf\(264.18 KB\)](#) Additional Information: [full citation](#), [at terms](#)

Software debugging is an extremely difficult cognitive process requiring application behavior along with detailed understanding of specific applic Typical debuggers provide inadequate support for this process, focusing accessible through source code. To overcome this deficiency, we link dy state to a Unified Modeling Language (UML) object diagram. We enhan diagram with focus + context, gr ...


**Keywords:** Unified Modeling Language (UML), software visualization

### 4 Component-based software engineering: A component-based visual enviro: process

 G. Costagliola, R. Francese, M. Risi, G. Scanniello, A. De Lucia

July 2002 **Proceedings of the 14th international conference on Softwar knowledge engineering SEKE '02**

**Publisher:** ACM Press

Full text available:  [pdf\(149.69 KB\)](#) Additional Information: [full citation](#), [at terms](#)

KB)

We present the Component-Based Visual Environment Development (C) building visual language environments and introduce the Visual Language supporting its implementation. The proposed approach is based on software granularity levels and enables incremental development. The VLDesk extracted from the development of the Visual Language Compiler-Compiler functionalities with many adjunctive features use ...


**Keywords:** component development, development process, methodology, visual language

**5** A visualization system for parallelizing programs


C.-R. Dow, S.-K. Chang, M. L. Soffa

December 1992 **Proceedings of the 1992 ACM/IEEE conference on Supercomputing**


**Publisher:** IEEE Computer Society Press

Full text available:  [pdf\(1.01 MB\)](#) Additional Information: [full citation, reterms](#)

**6** A VISUAL ENVIRONMENT FOR DISTRIBUTED SIMULATION SYSTEMS


 James H. Graham, Adel S. Elmaghraby, Irfan Karachiwala, Hussam Soliman  
January 1996 **ACM SIGSIM Simulation Digest**, Volume 25 Issue 3



**Publisher:** ACM Press

Full text available:  [pdf\(919.47 KB\)](#) Additional Information: [full citation, abstract](#)

Parallel and Distributed Simulation (PADS) algorithms are typically categorized of two categories. They are either conservative or optimistic with respect to handling causality. Conservative systems strictly preserve causality, while optimistic systems detect and correct causality errors when they occur. *Time Warp* is the basic algorithm where rolling back the simulation clock allows the simulation to proceed. Global Virtual Time ...


**7** Computing curricula 2001

 September 2001 **Journal on Educational Resources in Computing (JERC)**  
**Publisher:** ACM Press

Full text available:  [pdf\(613.63 KB\)](#)  [html \(2.78 KB\)](#) Additional Information: [full citation, re terms](#)


- 8 Distributed environment: Narratives of space and time: visualization for dis  
 Patrick J. Finnigan, Kelly A. Lyons  
 October 1991 **Proceedings of the 1991 conference of the Centre for Adv**  
**Collaborative research**

**Publisher:** IBM Press

Full text available:  [pdf\(1.65 MB\)](#) Additional Information: [full citation, at](#)


Programmers of distributed applications face the challenge of building co  
 (CP) in a complex, heterogeneous network with distributed data and serv  
 to build these systems are emerging, but widespread acceptance will requ  
 visualization and user interface technologies to reduce complexity. In this  
 and describe some initial results for visualizing three aspects of distribut  
 [25) ...

**Keywords:** distributed systems, iconic programming, network managem

- 9 Technical papers: requirements engineering: Detection of conflicting funct  
 case-driven approach: a static analysis technique based on graph transform:  
 Jan Hendrik Hausmann, Reiko Heckel, Gabi Taentzer

May 2002 **Proceedings of the 24th International Conference on Softwa**

**Publisher:** ACM Press

Full text available:  [pdf\(1.55 MB\)](#) Additional Information: [full citation, at index terms](#)


In object-oriented software development, requirements of different stake  
 manifested in use case models which complement the static domain mod  
 functional requirements. In the course of development, these requiremen  
 integrated to produce a consistent overall requirements specification. Iter  
 be triggered by conflicts between requirements of different parties. Howe  
 incompleteness, and informal nature ...

**Keywords:** UML, graph transformation, requirements specification, uni

**10** VisualGraph: a graph class designed for both undergraduate students and e

◆ Jeff Lucas, Thomas L. Naps, Guido Rossling  
January 2003 **ACM SIGCSE Bulletin , Proceedings of the 34th SIGCSE  
Computer science education SIGCSE '03**, Volume 35 Issu

**Publisher:** ACM Press


Full text available:  [pdf\(1.55 MB\)](#) Additional Information: [full citation](#), [ab terms](#)

Graphs and graph algorithms play an important role in undergraduate dat algorithms courses. However, they often also represent the first case whe and the underlying concepts of the algorithms are not evident. Both stud therefore benefit from a simple yet expressive tool for coding graph algo conveniently visualizing them. We present such a tool, derived from a se requirements, and give an example applic ...

**Keywords:** CS 1, animation, graphs, pedagogy, visualization

**11** A bug's eye view of immediate visual feedback in direct-manipulation prog


◆ Curtis Cook, Margaret Burnett, Derrick Boom  
October 1997 **Papers presented at the seventh workshop on Empirical s**  
**Publisher:** ACM Press

Full text available:  [pdf\(1.87 MB\)](#) Additional Information: [full citation](#), [re terms](#)

**12** An annotated bibliography of interactive program steering

◆ Weiming Gu, Jeffrey Vetter, Karsten Schwan  
September 1994 **ACM SIGPLAN Notices**, Volume 29 Issue 9

**Publisher:** ACM Press


Full text available:  [pdf\(1.24 MB\)](#) Additional Information: [full citation](#), [ci](#)

**13 Limiting the probe effect in debugging concurrent object-oriented program**

Ilene Seelemaann


November 1995 **Proceedings of the 1995 conference of the Centre for A Collaborative research**

**Publisher:** IBM Press

Full text available:  [pdf\(290.62 KB\)](#) Additional Information: [full citation, at terms](#)


Event-based tracers for visualizing distributed applications use process-t demonstrating interaction among processes. Object-oriented programs ca similar presentation in which object-time diagrams are drawn and the int represents method invocations. In this type of diagram, it is necessary to methods involved. This paper presents an approach for resolving and stor names at debug time instead ...

**14 Visualizing interactions in program executions**

 Dean F. Jerding, John T. Stasko, Thomas Ball


May 1997 **Proceedings of the 19th international conference on Softwar**

**Publisher:** ACM Press

Full text available:  [pdf\(1.72 MB\)](#) Additional Information: [full citation, re terms](#)


**Keywords:** object-oriented software engineering, program understanding software visualization

**15 Teaching computer graphics visual literacy to art and computer science stu resources and opportunities**

 Dena Eber, Rosalee Wolfe






May 2000 **ACM SIGGRAPH Computer Graphics**, Volume 34 Issue 2

**Publisher:** ACM Press

Full text available:  [pdf\(943.87 KB\)](#) Additional Information: [full citation, at](#)

Although it is a requisite skill for success in industry, visual literacy in g computer science and art students. Computer science majors are uneasy : examine images while art students may not have much background in the

This column is the second in a two-part series that discusses an interdisciplinary technique that overcomes these obstacles. Part one was published in *Con* February 2000, ...

- 16 Applying algorithm animation techniques for program tracing, debugging.  
Sougata Mukherjea, John T. Stasko  
May 1993 **Proceedings of the 15th international conference on Software Engineering**  
**Publisher:** IEEE Computer Society Press  
Full text available:  [pdf\(909.31 KB\)](#) Additional Information: [full citation, re](#)
- 17 Finding and using implicit structure in human-organized spatial layouts of  
 Frank M. Shipman, Catherine C. Marshall, Thomas P. Moran  
May 1995 **Proceedings of the SIGCHI conference on Human factors in Computing Systems**  
**Publisher:** ACM Press/Addison-Wesley Publishing Co.  
Full text available:  [html\(39.44 KB\)](#) Additional Information: [full citation, re terms](#)
- 18 A test environment for natural language understanding systems  
Li Li, Deborah A. Dahl, Lewis M. Norton, Marcia C. Linebarger, Dongdong Zhang  
August 1998 **Proceedings of the 17th international conference on Computational Linguistics - Volume 2 , Proceedings of the 36th annual meeting on Association for Computational Linguistics - Volume 2**  
**Publisher:** Association for Computational Linguistics , Association for Computational Linguistics  
Full text available:  [pdf\(400.11 KB\)](#)  Additional Information: [full citation, at Publisher Site](#)


The Natural Language Understanding Engine Test Environment (ETE) is a test environment that aids in the development and maintenance of large, modular, natural language understanding systems. Natural language understanding systems are composed of modules (e.g., speech taggers, parsers and semantic analyzers) which are difficult to test due to the complexity of their output data structures. Not only are the output data structures complex, but the modules themselves are complex, and the interactions between them are complex.



**19 Debugging temporal specifications with concept analysis**

◆ Glenn Ammons, David Mandelin, Rastislav Bod k, James R. Larus  
May 2003 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLA  
Programming language design and implementation PLDI '0**

**Publisher:** ACM Press

Full text available:  [pdf\(154.43 KB\)](#) Additional Information: [full citation](#), [at index terms](#)


Program verification tools (such as model checkers and static analyzers) programs. These tools need formal specifications of correct program behavior. Correct specification is difficult, just as writing a correct program is difficult. For methods for debugging programs, we need methods for debugging specifications. This paper describes a novel method for debugging formal, temporal specifications. short program executi ...

**Keywords:** concept analysis, hierarchical clustering, specification debug specifications

**20 A hybrid visual environment for models and objects**

◆ Paul A. Fishwick  
December 1999 **Proceedings of the 31st conference on Winter simulation  
to the future - Volume 2**

**Publisher:** ACM Press

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## 1 [Incremental analysis of constraint logic programs](#)

 Manuel Hermenegildo, German Puebla, Kim Marriott, Peter J. Stuckey  
March 2000 **ACM Transactions on Programming Languages and Systems**  
Volume 22 Issue 2

**Publisher:** ACM Press

Full text available:  [pdf\(399.84 KB\)](#) Additional Information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)

Global analyzers traditionally read and analyze the entire program at once in a nonincremental way. However, there are many situations which are not covered by a simple model and which instead require reanalysis of certain parts of a program that have already been analyzed. In these cases, it appears inefficient to perform the analysis of the program again from scratch, as needs to be done with current systems. We present fixed-point algorithms used in current generic analyzers.


**Keywords:** abstract interpretation, constraint logic programming, incremental analysis

## 2 [Annotation-directed run-time specialization in C](#)

Brian Grant, Markus Mock, Matthai Philipose, Craig Chambers, Susan J. Eggers

- ◆ December 1997 **ACM SIGPLAN Notices , Proceedings of the 1997 ACM symposium on Partial evaluation and semantics-based manipulation PEPM '97**, Volume 32 Issue 12

**Publisher:** ACM Press

Full text available:  [pdf\(1.99 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)


We present the design of a dynamic compilation system for C. Directed by user annotations specifying where and on what dynamic compilation is to be performed, the binding time analysis computes the set of run-time constants at each point in the annotated procedure's control flow graph; the analysis supports program-level polymorphic division and specialization. The analysis results guide the code generation of a specialized run-time specializer for each dynamically compiled function.

### 3 Multi-pass execution of functional logic programs

- ◆ Jukka Paakki

February 1994 **Proceedings of the 21st ACM SIGPLAN-SIGACT symposium on Principles of programming languages**

**Publisher:** ACM Press

Full text available:  [pdf\(1.33 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)



An operational semantics for functional logic programs is presented. In this semantics, functional terms provide for reduction of expressions, provided that the semantics is based on multi-pass evaluation techniques originally developed for logic grammars. Program execution is divided into two phases: (1) construction of a proof tree, and (2) its decoration into a complete proof tree. The construction uses a modified SLD-resolution scheme, and the decoration uses a

### 4 Embedded program timing analysis based on path clustering and architecture

R. Ernst, W. Ye

November 1997 **Proceedings of the 1997 IEEE/ACM international conference on Computer-aided design**

**Publisher:** IEEE Computer Society

Full text available:  [pdf\(315.03 KB\)](#) 

[Publisher Site](#)


Additional Information: [full citation](#), [abstracts](#), [index terms](#)

Formal Program running time verification is an important issue in system for performance optimization under "first-time-right" design constraints system verification. Simulation based approaches or simple instruction c appropriate and risky for more complex architectures in particular with d execution paths. Formal analysis techniques have suffered from loose tir to significant performance penalties when strictly adh ...

##### 5 Points-to analysis for Java using annotated constraints

- ◆ Atanas Rountev, Ana Milanova, Barbara G. Ryder  
October 2001 **ACM SIGPLAN Notices , Proceedings of the 16th ACM : conference on Object oriented programming, systems, lai applications OOPSLA '01**, Volume 36 Issue 11

**Publisher:** ACM Press


Full text available:  [pdf\(263.51 KB\)](#) Additional Information: [full citation](#), [abst citings](#), [index ter](#)

The goal of point-to analysis for Java is to determine the set of objects p reference variable or a reference object field. This information has a wid applications in optimizing compilers and software engineering tools. In t present a point-to analysis for Java based on Andersen's point-to analysis implement the analysis by using a constraint-based approach which emp *inclusion constraints*. Constraint annotations allow u ...

##### 6 Pointer analysis for multithreaded programs

- ◆ Radu Rugina, Martin Rinard  
May 1999 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLA on Programming language design and implementation PLDI** Issue 5

**Publisher:** ACM Press

Full text available:  [pdf\(1.82 MB\)](#) Additional Information: [full citation](#), [abst citings](#), [index ter](#)


This paper presents a novel interprocedural, flow-sensitive, and context- analysis algorithm for multithreaded programs that may concurrently up For each pointer and each program point, the algorithm computes a cons approximation of the memory locations to which that pointer may point. correctly handles a full range of constructs in multithreaded programs, ir functions, function pointers, structures, arrays, nested stru ...

## 7 Pointer analysis for structured parallel programs

◆ Radu Rugina, Martin C. Rinard

January 2003 **ACM Transactions on Programming Languages and Systems**  
Volume 25 Issue 1

**Publisher:** ACM Press

Full text available:  [pdf\(383.29 KB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

This paper presents a novel interprocedural, flow-sensitive, and context-sensitive analysis algorithm for multithreaded programs that may concurrently update shared memory. The algorithm is designed to handle programs with structured parallel constructs, parallel loops, and conditionally spawned threads. For each program point, the algorithm computes a conservative approximation of the set of memory locations to which that pointer may point. Th ...


**Keywords:** Pointer analysis

## 8 Incremental global reoptimization of programs

◆ Lori L. Pollock, Mary Lou Soffa

April 1992 **ACM Transactions on Programming Languages and Systems**  
Volume 14 Issue 2

**Publisher:** ACM Press

Full text available:  [pdf\(1.88 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)

Although optimizing compilers have been quite successful in producing code that is fast and compact, factors that limit their usefulness are the accompanying long compilation times and the lack of good symbolic debuggers for optimized code. One approach to attaining fast compilation and recompilations is to reduce the redundant analysis that is performed for each compilation, in response to edits, and in particular, small maintenance changes, without sacrificing the quality of the generated code. Although modular program ...


**Keywords:** compiler optimization, incremental data flow analysis, incremental compilation, reoptimization, optimization dependencies

## 9 Alias annotations for program understanding

Jonathan Aldrich, Valentin Kostadinov, Craig Chambers

- ◆ November 2002 **ACM SIGPLAN Notices , Proceedings of the 17th ACM conference on Object-oriented programming, systems, applications OOPSLA '02, Volume 37 Issue 11**

**Publisher:** ACM Press

Full text available:  [pdf\(336.14 KB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

One of the primary challenges in building and evolving large object-oriented programs is understanding aliasing between objects. Unexpected aliasing can lead to mistaken assumptions, security holes, and surprising side effects, all of which are software defects and complicate software evolution. This paper presents a capability-based alias annotation system for Java that makes alias patterns visible in source code, enabling developers to reason more effectively about aliasing.


**Keywords:** aliasing, aliasjava, encapsulation, java, ownership types, type uniqueness

- 10 [Interactive type analysis and extended message splitting: optimizing dynamically oriented programs](#)

◆ Craig Chambers, David Ungar

June 1990 **ACM SIGPLAN Notices , Proceedings of the ACM SIGPLAN on Programming language design and implementation PLDI Issue 6**

**Publisher:** ACM Press

Full text available:  [pdf\(1.58 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

Object-oriented languages have suffered from poor performance caused by slow dynamically-bound procedure calls. The best way to speed up a program is to compile it out, but dynamic binding of object-oriented procedure calls without type information precludes inlining. Iterative type analysis and extended message splitting are new compilation techniques that extract much of the necessary type information to make it possible to compile object-oriented programs.


- 11 [Separation constraint partitioning: a new algorithm for partitioning non-strict sequential threads](#)

◆ Klaus E. Schauser, David E. Culler, Seth C. Goldstein

January 1995 **Proceedings of the 22nd ACM SIGPLAN-SIGACT symposium**


## Principles of programming languages

**Publisher:** ACM Press

Full text available:  [pdf\(1.56 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)


In this paper we present substantially improved thread partitioning algorithms for implicitly parallel languages. We present a new block partitioning algorithm for constraint partitioning, which is both more powerful and more flexible than previous algorithms. Our algorithm is guaranteed to derive maximal threads. We present a framework for proving the correctness of our partitioning approach, and separation constraint partitioning makes ...

### 12 [Live-structure dataflow analysis for Prolog](#)

 Anne Mulkers, William Winsborough, Maurice Bruynooghe

March 1994 **ACM Transactions on Programming Languages and Systems**  
Volume 16 Issue 2

**Publisher:** ACM Press

Full text available:  [pdf\(3.59 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

For the class of applicative programming languages, efficient methods for reducing the memory occupied by released data structures constitute an important aspect of their implementations. The present article addresses the problem of memory management in programs through program analysis rather than by run-time garbage collection. We derive run-time properties that can be used at compile time to specialize the program according to a given set of queries and ...


**Keywords:** Prolog, abstract interpretation, compile-time garbage collection, program analysis

### 13 [Parametric shape analysis via 3-valued logic](#)

 Mooly Sagiv, Thomas Reps, Reinhard Wilhelm

May 2002 **ACM Transactions on Programming Languages and Systems**  
Volume 24 Issue 3

**Publisher:** ACM Press

Full text available:  [pdf\(1.10 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

Shape analysis concerns the problem of determining "shape invariants" to perform destructive updating on dynamically allocated storage. This article presents a parametric framework for shape analysis that can be instantiated in different shape-analysis algorithms that provide varying degrees of efficiency. A key innovation of the work is that the stores that can possibly arise during execution are represented (conservatively) using 3-valued logic ...


**Keywords:** 3-valued logic, Abstract interpretation, alias analysis, destructive updating, pointer analysis, shape analysis, static analysis

**14** Improving the accuracy of Petri net-based analysis of concurrent programs

◆ A. T. Chamillard, Lori A. Clarke

May 1996 **ACM SIGSOFT Software Engineering Notes**, Proceedings of the SIGSOFT international symposium on Software testing and analysis '96, Volume 21 Issue 3

**Publisher:** ACM Press

Full text available:  [pdf\(1.43 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)


Spurious results are an inherent problem of most static analysis methods. In an effort to produce conservative results, overestimate the executable behavior, and identify infeasible paths, an analysis may be too conservative. Infeasible paths and imprecise alias resolution are the two causes of such errors. In this paper we present an approach for improving the accuracy of Petri net-based analysis of concurrent programs by including additional program state information in the analysis. We present empirical results that demonstrate the effectiveness of this approach.

**15** Contextual def-use associations for object aggregation

◆ Amie L. Souter, Lori L. Pollock

June 2001 **Proceedings of the 2001 ACM SIGPLAN-SIGSOFT workshop on Object-oriented programming systems, languages, and engineering analysis for software tools and engineering**

**Publisher:** ACM Press

Full text available:  [pdf\(178.90 KB\)](#) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

This paper presents a novel formulation of definitions, uses, and def-use associations in object-oriented programs by exploiting the relations that occur between objects and their instantiated objects due to aggregation. Contextual def-use associations are computed by generating a partial call sequence for each def and use base.




aggregation relations. By extending an escape points-to graph representation we have developed and implemented three strategies ...

**16** Type-based flow analysis: from polymorphic subtyping to CFL-reachability

◆ Jakob Rehof, Manuel Fähndrich

January 2001 **ACM SIGPLAN Notices , Proceedings of the 28th ACM SIGACT symposium on Principles of programming languages**  
Volume 36 Issue 3

**Publisher:** ACM Press

Full text available:  [pdf\(1.23 MB\)](#) Additional Information: [full citation](#), [abstract terms](#)


We present a novel approach to scalable implementation of type-based flow analysis for polymorphic subtyping. Using a new presentation of polymorphic subtyping and instantiation constraints, we are able to apply context-free language (CFL) techniques to type-based flow analysis. We develop a CFL-based algorithm for flow-information in time  $O(n^3)$ , where  $n$  is the size of the typed program. Our algorithm substantially improves upon the best previously ...

**17** Automatic performance prediction to support cross development of parallel programs

◆ Matthias Schumann

January 1996 **Proceedings of the SIGMETRICS symposium on Parallel processing in systems and tools**

**Publisher:** ACM Press


Full text available:  [pdf\(1.32 MB\)](#) Additional Information: [full citation](#), [references](#)

**18** Efficient composite data flow analysis applied to concurrent programs

◆ Gleb Naumovich, Lori A. Clarke, Leon J. Osterweil

July 1998 **ACM SIGPLAN Notices , Proceedings of the 1998 ACM SIGPLAN workshop on Program analysis for software tools and engineering**  
Volume 33 Issue 7

**Publisher:** ACM Press

Full text available:  [pdf\(1.05 MB\)](#) Additional Information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)


FLAVERS, a tool for verifying properties of concurrent systems, uses context-sensitive flow analysis.

analysis to incrementally improve the precision of the results of its verification. FLAVERS is one of the few static analysis techniques for concurrent systems. Due to its potential to handle large scale systems, it sometimes can still be very expensive. In this paper we experimentally compare the cost of two versions of this approach on composite data flow analysis problems. The first version is the original FLAVERS.

## 19 Parallel execution of prolog programs: a survey

◆ Gopal Gupta, Enrico Pontelli, Khayri A.M. Ali, Mats Carlsson, Manuel V. Hermenegildo  
July 2001 **ACM Transactions on Programming Languages and Systems**  
Volume 23 Issue 4

**Publisher:** ACM Press

Full text available:  pdf(1.95 MB) Additional Information: [full citation](#), [abstracts](#), [citations](#), [index terms](#)


Since the early days of logic programming, researchers in the field realized the potential exploitation of parallelism present in the execution of logic programs. The nature, the presence of nondeterminism, and their referential transparency characteristics, make logic programs interesting candidates for obtaining parallel execution. At the same time, the fact that the typical applications of logic programming frequently involve irregular computation patterns makes parallelization a non-trivial task.

**Keywords:** Automatic parallelization, constraint programming, logic programming, parallelism, prolog

## 20 Beyond ASIS: program data bases and tool-oriented queries

◆ Janusz Laski, William Stanley, Pawel Podgorski  
September 2001 **ACM SIGAda Ada Letters**, **Proceedings of the 2001 annual SIGAda international conference on Ada SIGAda '01**,  
4

**Publisher:** ACM Press

Full text available:  pdf(49.44 KB) Additional Information: [full citation](#), [abstracts](#), [index terms](#)

The availability of higher level ASIS libraries is of prime importance for ASIS technology to facilitate the development of Software Analysis and tools. This is due to the fact that ASIS queries are expressed in terms of an immensely complex language and do not directly support the objectives of this paper. In this paper we discuss two plausible sets of higher levels, tool-oriented queries and tool-independent queries.

Program Under Analysis (PUA), which ideally d ...




**Keywords:** ASIS, Ada, Software, dynamic analysis, program data bases, dependencies, queries, static analysis, testing, verification

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L3	425	717/131.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 14:28
L4	103	717/132.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 14:28
L5	79	717/133.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 14:29
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L8	163	(ide or visual\$7 or analy\$4 ) and (graph or tree or nodes) and (annotat\$5 ) and (object near2 (contains or nest\$3 or refer\$7 ) ) and (cfg or "control flow" or call\$3 or stack ) and 717/???.ccls. and (render\$3 or display\$3 or present\$5 )	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 14:33

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L12	8	("6343376" "5313616" "6823507" "6381735" "6823507" ).pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 14:46
L13	28	("4533997"   "4931928"   "5263162"   "5432942"   "5590330"   "5793374"   "5854924"   "5862382"   "5881290"   "5933635"   "5937190"   "6009256"   "6071317"   "6125439"   "6151701"   "6154876"   "6240376"   "6243848"   "6311327"   "6336087"   "6412106"   "6594761"   "6601235"   "6766481"   "6779114"   "6820256"   "6928638"   "6961925").PN. OR ("7051322").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2007/01/03 15:13

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L15	892	(717/12?.ccls. or 717/13?.ccls. ) and (graph\$3 or tree or node) and (cfg or flow or call\$3 ) and (object near3 (nest\$3 or refer\$3 or referenc\$3 or contain\$3 or hierarchy or hierarchical\$3 ) )	US-PGPUB; USPAT; USOCR	OR	ON	2007/01/03 15:41
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L17	11	(717/12?.ccls. or 717/13?.ccls. ) and (graph\$3 or tree or node) same (cfg or flow or call\$3 ) same annotat\$5 and (object near3 (nest\$3 or refer\$3 or referenc\$3 or contain\$3 or hierarchy or hierarchical\$3 ) ) and (gui or ui or visual\$7 or view\$3 )	US-PGPUB; USPAT; USOCR	OR	ON	2007/01/03 15:42



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[PS] [Program Slicing: An Application of Object-Oriented Program Dependency Graphs](#) - group of 5 »

A Krishnaswamy - 1994 - korson-mcgregor.com

... oriented slice is more complex than **determining**

either an ... features are seen as we

move up the **hierarchy**. ... **Objects** interact in an

**object**-oriented system by ...

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[Automated maintenance of avionics software](#) - group of 3 »

JP Loyall, SA Mathisen, PJ Hurley, JS Williamson - Aerospace and Electronics Conference, 1993.

NAECON 1993., ..., 1993 - [ieeexplore.ieee.org](#)

... examines the coverage information produced to

**determine** whether any ... the user to organize

a **hierarchy** of test ... Multiple files of these **objects**

can be maintained ...

[Cited by 3](#) - [Related Articles](#) - [Web Search](#) - [BL Direct](#)

[Metrics for quality and concurrency in object-based systems](#)

LR Welch, M Lankala, W Farr, DK Hammer - Annals of Software Engineering, 1996 - Springer

... This section presents techniques to **determine**

whether two statements can ... same **object**

instance, ie, [(Si, Sj) 6 IDG(a ... 3. The control **flow** of method a is such ...

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**OBJECT MANAGEMENT SUPPORT FOR THE  
CONSTRUCTION OF COMPLEX APPLICATIONS -  
group of 2 »**

PL TARR - 1996 - laser.cs.umass.edu

... Control **Flow** Graph ... tion to **determine** which  
procedures would be affected if a ... suggests  
a number of necessary **object** management capabilities,  
as described below. ...

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**Developing and integrating ProDAG in the Arcadia  
environment - group of 3 »**

DJ Richardson, TO O'Malley, CT Moore, SL Aha -  
ACM SIGSOFT Software Engineering Notes, 1992 -  
portal.acm.org

... ing, **object** management, user interface development,  
process ... loop by **determining** whether  
the loop terminates — that is, ... a DGI to the control  
**flow** graph and ...

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Direct

**Applying predication to efficiently handle runtime class  
testing - group of 3 »**

C Sadler, SKS Gupta, R Bhatia - ACM SIGARCH  
Computer Architecture News, 2000 - portal.acm.org

... some identifier(s) from the receiver **object** that can  
be ... 2. Evaluate each class test,  
and **determine** whether to ... in and performance of the  
memory **hierarchy** can be ...

Related Articles - Web Search - BL Direct

**[PS] Virtual Method Resolution with Typed Alias  
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M Schordan, W Amme - Proceedings of the 8th  
International Workshop on Compilers ..., 2000 -  
143.205.180.128



... They apply type **hierarchy** analysis, type propagation, aggregate ... time alias analysis for **object**-oriented languages ... graphs we are able to **determine** which virtual ...

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[An Efficient Resource-constrained Global Scheduling Technique For Superscalar And Vliw Processors](#) - group of 2 »

SM Moon, K Ebcioglu - Microarchitecture, 1992. MICRO 25., Proceedings of the 25th ..., 1992 - [ieeexplore.ieee.org](#)

... 2.1 VLIW tree instruction The VLIW program is a control **flow** graph (**CFG**) where each node is ... Each directed edge of the tree is **annotated** with zero or more ...

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[Symbolic computing, Lisp languages, and parallel computing](#)

MM Furnari, A Massarotti - Massively Parallel Computing Systems, 1994., Proceedings of ..., 1994 - [ieeexplore.ieee.org](#)

... parallelism is expressed by the task **hierarchy**, and the ... is generally captured into time Control **Flow** Graph (**CFG** ... y be two distinct nodes of the **CFG**, then exactly ...

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[Program Comprehension](#) - group of 7 »

S Rugaber - Encyclopedia of Computer Science and Technology, 1995 - [cs.concordia.ca](#)

... an AST by walking the tree to **determine** basic blocks ... In a PDG control and **data flow** dependencies are treated together ... otherwise require both a DFG and a **CFG**. ...

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N Stankovic, K Zhang - Proceedings of the High-Performance Computing on the ..., 1997 - doi.ieeecs.org

... deals with problems of logical and performance

**debugging.** ... lines, that are drawn firstduring **visual** programming ... The tool is built upon an**object-oriented** model ...Web Search**Visualizing Interactions in Program Executions - group of 11 »**

DF Jerding, JT Stasko, T Ball - Software Engineering, 1997., Proceedings of the 1997 (19th) ..., 1997 - ieexplore.ieee.org

... an example call trace, call tree, and call **graph.** ... Polka is an **object-oriented** toolkitfor creating algorithm ... The major **visual** innovation in the Execution Mural ...Cited by 89 - Related Articles - Web Search - Library Search - BL Direct**[BOOK] Object-oriented software construction - group of 23 »**

B Meyer - 1997 - Prentice-Hall, Inc. Upper Saddle River, NJ, USA

... design of an OCL query-based **debugger** for C++ ... Jens Palsberg , Michael I. Schwartzbach,**Object-oriented** type ... run-time systems and its **visual** programming language ...Cited by 3856 - Related Articles - Web Search - Library Search

Visual testing of software - group of 2 »

J Lönnberg - Master's thesis, Helsinki University of Technology, Oct, 2003 - cs.hut.fi

... 35 4.5.11 Slicing and dependence **graphs** . . . procedural languages (with or without **object-orientation**) such ... **visual** debuggers" (eg the Javix **Visual Debugger** [68 ...

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Complete visualizations of concurrent programs and their executions

KM Kahn, VA Saraswat - **Visual** Languages, 1990., Proceedings of the 1990 IEEE ..., 1990 - ieeexplore.ieee.org

... manner to facilitate the perception of **object** coherence and ... edit, under- stand, think of, run, **debug** and otherwise ... patterns in static and dynamic **visual** input. ...

Cited by 102 - Related Articles - Web Search

Cover yourself with Skin - group of 7 »

JG Hosking, S Fenwick, WB Mugridge, JC Grundy - Proceedings of OZCHI'95, 1995 - itee.uq.edu.au

... Future work includes reuse of Skin **graphs** for visualising execution of Skin functions ...

[6] Fenwick, S. 1994: A **Visual Debugger** for **Object-Oriented** Programs ...

Cited by 8 - Related Articles - View as HTML - Web Search

An open **graph** visualization system and its applications to software engineering - group of 16 »

ER Gansner, SC North - Software Practice and Experience, 2000 - doi.wiley.com

... same as conventional scripting languages (**Visual** Basic, Unix ... Grappa has classes for **graph** representation, presentation, and ... sub-classes of

Grappa **object** classes ...

Cited by 242 - Related Articles - Web Search - BL Direct

Design, construction, and application of a generic **visual** language generation environment - group of 8 »

K Zhang, DQ Zhang, J Cao - IEEE Transactions on Software Engineering, 2001 - doi.ieeecs.org

... as a compiler, its associated syntax directed editor, and **debugger**. ... 22 shows the

**visual** objects used in a ... An **annotation object** can specify the **annotation** for a ...

Cited by 29 - Related Articles - Web Search - BL Direct

Event **graph** visualization for debugging large applications - group of 3 »

D Kranzlmüller, S Grabner, J Volkert - Proceedings of the SIGMETRICS symposium on Parallel and ..., 1996 - portal.acm.org

... This **object** oriented approach allows us to easily extend and ... The most important events in **debug-** ging message passing ... is also applied to the **visual-** ization of ...

Cited by 24 - Related Articles - Web Search

A component-based **visual** environment development process

G Costagliola, R Francese, M Risi, G Scanniello, A ... - Proceedings of the 14th international conference on Software ..., 2002 - portal.acm.org

... and represent the dynamic aspects of the **object** belonging to a ... **debugger** extends the classic definition of compiler **debugger** to the **visual** environment case. ...

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C Chambers

J Ning

W Kozaczynski

F Wolf

D Ungar

A Knowledge Base for Program Debugging - group of 5

»

A Tubaishat - Proceedings of the ACS/IEEE

International Conference on ..., 2001 -

doi.ieeecomputersociety.org

... on B if there exist a control **flow** path from ... Their relationships in the knowledge

**hierarchy** are indicated using ... format: If Chunk A MATCH Knowledge **Object B** has ...

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[PS] Program Slicing: An Application of Object-Oriented Program Dependency Graphs - group of 5 »

A Krishnaswamy - 1994 - korson-mcgregor.com

... **Dependence** Subgraph (CDS), a Control **Flow** Graph (CFG ... the representation is the Class

**Hierarchy** Subgraph (CHS ... the three subgraphs is the **Object-oriented** Program ...

Cited by 29 - Related Articles - View as HTML - Web Search

A Knowledge-based Approach To Software System Understanding

W Kozaczynski, S Letovsky, J Ning, A Consulting - Knowledge-Based Software Engineering Conference, 1991. ..., 1991 - ieexplore.ieee.org

... Once the ASTs are **annotated** with semantic descriptions ... but can be applied to non-**object-oriented** languages ... automatic program decomposition based on **flow** and **data** ...

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Issues in the testing of **object**-oriented software

EV Berard - Electro/94 International. Conference

Proceedings. Combined ..., 1994 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... Therefore, in addition to source code and **object** code, we ... exceptions, interrupts

cause changes in control **flow** without the ... Boundary value **analysis**," one of ...

Cited by 15 - Related Articles - Web Search - BL Direct

Meta-Data Components in Support of an Active

Deductive **Object**-Oriented Database System - group of 3 »

TB Abdellatif, HWR Chan, SW Dietrich, B ... - Proc.

Third IEEE Meta-Data Conf., Apr, 1999 - [computer.org](http://computer.org)

... the root of the meta-model class **hierarchy** to require ... SW, and Urban, SD, "On Control

**Flow** Testing of Active Rules in a Declarative **Object**-Oriented Framework ...

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A prototype tool for **flow analysis** of **object**-oriented programs - group of 5 »

J Gustafsson - **Object**-Oriented Real-Time Distributed

Computing, 2002.(ISORC ..., 2002 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... time for **object**-oriented programs one needs **flow** information, such ... Figure 5. Class

**hierarchy** for example 3 ... The program creates a polymorphic **object** a. Since the ...

Cited by 3 - Related Articles - Web Search

Path clustering in software timing **analysis** - group of 5 »

FE Wolf, RW Ye - Very Large Scale Integration (VLSI)

Systems, IEEE ..., 2001 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org)

... If adjacent PCS on one level of **hierarchy** or child

PCS are classified as SFP, they

are ... The control **flow** defined by the OAM mode has been **annotated** using a ...

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Monitoring compliance of a software system with its high-level design models - group of 8 »

M Sefika, A Sane, RH Campbell - Proceedings ICSE, 1996 - doi.ieeecomputersociety.org

... oriented systems is an inheritance **hierarchy** rooted at ... static call graphs and animated **object** interactions, and ... of the relations invokes, control-**flow**, and datu ...

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Interactive visual debugging with UML

T Jacobs, B Musial - Proceedings of the 2003 ACM symposium on Software ..., 2003 - portal.acm.org

... calculations due to the flatness of the inheritance **hierarchy**. ... also draw attention to the **flow** of control ... Figure 8. **Object** Diagram with focus + context applied ...

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Hpctoolkit: Multi-platform tools for profile-based performance analysis

J Mellor-Crummey - 5th International Workshop on Automatic Performance **Analysis** ..., 2003 - cs.rice.edu  
... complex memory **hierarchy** non-blocking, multi-level caches TLB ... binary **object** code compilation ... Construct control **flow** graph using branch target **analysis** ...

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